PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY.

VOL. I. NOVEMBER & DECEMBER, 1839. No. 9.

Stated Meeting, November 1.

Present, twenty-two members.

Mr. DU PONCEAU, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Astronomical Observations, made at the Royal Observatory, Edinburgh. By Thomas Henderson, F.R.S.E., &c. Vol. II. For the year 1836. Edinburgh, 1839.—*From the Royal Society of London.*

Nieuwe Verhandelingen der Eerste Klasse van het Koninklijk-Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone Kunsten te Amsterdam. Vols. I. to V. inclusive. Amsterdam, 1827 to 1836. *From the Royal Institute.*

Proceedings and Debates of the Convention of the Commonwealth of Pennsylvania, to propose Amendments to the Constitution, commenced and held at Harrisburg, on the second of May, 1837. Thirteen Volumes. Harrisburg, 1837 to 1839.—*From Mr. C. J. Ingersoll.*

Journal of the Convention of the State of Pennsylvania, to propose Amendments to the Constitution, commenced and held at the state capitol in Harrisburg, on the second of May, 1837. Two Vols. Harrisburg, 1837, and Philadelphia, 1838.—*From the same.*

Third Annual Report on the Geology of the State of Maine. By Charles T. Jackson, M. D. Augusta, 1839.—*From Mr. John Sergeant.*

Reports on the Ichthyology and Herpetology of Massachusetts. By D. Humphreys Storer, M. D.—*From the Author.*

Carte Générale de l'Empire d'Allemagne, par M. Chauchard. Paris, 1791.—*From Mr. Du Ponceau.*

Carte de la Partie Septentrionale de l'Italie, par M. Chauchard. Paris, 1791.—*From the same.*

Renati Descartes Principia Philosophiæ. Amsterdam, 1692.—*From Mr. William Kintzing.*

Friderici Wilhelmi Pestel Commentarii de Republicâ Batavâ. Leyden, 1782.—*From Mr. John Vaughan.*

Meteorological Essays and Observations. By J. Frederic Daniell, F.R.S. London, 1827.—*From the same.*

New Remedies: the Method of preparing and administering them; their Effects on the healthy and diseased Economy, &c. By Robley Dunglison, M. D. Philadelphia, 1839.—*From the Author.*

The Select Medical Library. Six Volumes. Philadelphia, 1838 and 1839.—*From the Editor.*

The Eclectic Journal of Medicine. Edited by John Bell, M. D. Vol. III. Philadelphia, 1839.—*From the Editor.*

The American Journal of Science and Arts. Conducted by Benjamin Silliman, M. D., LL. D., aided by Benjamin Silliman, jr., A.B. Vol. XXXVII. Nos. 1 and 2. For July and October. New Haven, 1839.—*From the Conductors.*

A letter was read from the Secretary of the Geographical Society of Paris, announcing the purpose of that society to form a Geographical Museum, and inviting contributions from the members of this society.

The Committee, consisting of Dr. Bache, Dr. Patterson and Mr. Booth, to whom the paper of Doctor Hare, read at the last meeting of the society, was referred, entitled, "Description of an Apparatus for deflagrating carburets, phosphurets, or cyanides, in vacuo, or in an atmosphere of hydrogen, between electrodes of charcoal; with an account of the results obtained by these and other means, especially the isolation of calcium, and formation of a new fulminating compound. By R. Hare, M. D., Professor of Chemistry in the University of Pennsylvania," reported in favour of publication in the Society's Transactions. The publication was ordered accordingly.

The apparatus is of a convenient construction for the purposes designated in the title of the paper. The lower electrode or cathode is a parallelopipedon of charcoal, on which the body is placed, to be subjected to the influence of one or more batteries; and tubes, with valve-cocks, communicating with an air-pump, a barometer-gauge, and a reservoir of hydrogen, open into the interior of a ground plate, on which a bell-glass is fitted, air tight. In the experiments of the author, an equivalent of lime was heated with one equivalent and a half of bicyanide of mercury, in a porcelain crucible, enclosed in the alembic made for this purpose, and described in a former paper. (See p. 131 of these Proceedings.) The weight of the residue was such as would result from the union of an equivalent of calcium with an equivalent of cyanogen. This was then subjected to galvanic action on the cathode of the apparatus, the anode being brought in contact with it, and the result was the production of masses on the charcoal, having a metallic appearance.

Phosphuret of calcium, exposed in the same manner, in the galvanic circuit, left pulverulent matter which effervesced in water, and, when rubbed on porcelain, appeared to contain metallic spangles, which were rapidly oxidized in the air.

In one experiment, particles of charcoal, apparently fused or resembling plumbago, dropped from the anode.

After heating lime with bicyanide of mercury, the mass was dissolved in acetic acid, in which nitrate of mercury produced a copious white precipitate, that detonated under the hammer like fulminating silver.

Doctor Coates announced the formation of the Pathological Society of this City, and adverted to some of its labours.

Doctor Hare made some observations on the method of obtaining oxygen from nitre.

He stated that the usual opinion of chemists, that the residuum is a hyponitrite in case the process is stopped during the extrication of pure oxygen, is erroneous; as he found that it always contained, under these circumstances, a considerable portion of undecomposed nitre. If the heat was pushed in order fully to change the nitre into hyponitrite, there was always an extrication of nitrogen.

Stated Meeting, November 15.

Present, twenty-nine members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

The Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. V. No. 10. London, 1839.—*From the Society.*

Journal of the House of Representatives of Pennsylvania. Session of 1838–39. Three Volumes. Harrisburg, 1838–39.—*From the State of Pennsylvania.*

Journal of the Senate of Pennsylvania. Session of 1838–39. Two Volumes, with an Appendix in one Volume. Harrisburg, 1838–39.—*From the same.*

Report of the State Treasurer, showing the Receipts and Expenditures at the Treasury of Pennsylvania, from the first day of November, 1837, to the thirty-first day of October, 1838. Harrisburg, 1838.—*From the same.*

Obras Completas de Luis de Camões, correctas e emendadas pelo cuidado e diligencia de J. V. Barreto Feio e J. G. Monteiro. Three Volumes. Hamburg, 1834.—*From Mr. E. F. França, Minister from Brazil.*

Storia dei Progetti e delle Opere per la Navigazione-Interna del Milanese di Giuseppe Bruschetti. Two Volumes. Milan, 1830.—*From Mr. Lewis Tinelli.*

Catalogo delle Opere più o meno estese in otto diverse Lingue pubblicate dal Conte Cavaliere Jacopo Grâberg da Hemsö. Florence, 1837.—*From the Author.*

Various Tracts relating to the Inhabitants, Geography, Agriculture, and Commerce of Marocco, Algiers, Tripoli, and Tuscany, by Count Jacob Grâberg da Hemsö.—*From the Author.*

Memoria sulla Scoperta dell'America nel Secolo Decimo dettata in Lingua Danese da Carlo Cristino Rafn e tradotta da Jacopo Grâberg da Hemsö. Pisa, 1839.—*From the Translator.*

L'Hivernage des Hollandais à la Nouvelle-Zemble, 1596, 1597, traduit de Tollens, par Auguste Clavareau. Maestricht, 1839.—*From M. Martini, Minister from Holland.*

Caspipina's Letters, to which are added the Life and Character of William Penn. By the Rev. Jacob Duché. Two Volumes. Bath, 1777.—*From Mr. Du Ponceau.*

Conjugation of the Verb "to hear," in its various forms in the Chippeway Language, by Dr. Edwin James, of Albany.—*From the same.*

Coleccion de los Tratados de Paz, Alianza, Comercio etc. ajustados por la Corona de España con las Potencias Estrangeras desde el Reynado del Señor Don Felipe Quinto hasta el Presente. Three Volumes. Madrid, 1796 to 1801.—*From the same.*

Translation of a Comparative Vocabulary of the Chinese, Corean, and Japanese Languages. Batavia, 1835.—*From Mr. W. H. Medhurst.*

An English and Japanese, and Japanese and English Vocabulary. Compiled from Native Works, by W. H. Medhurst. Batavia, 1830.—*From the same.*

Chinese Testament.—*From the same.*

Three Missionary Malay Tracts.—*From the Rev. Charles Gutzlaff.*

The Proceedings relative to calling the Conventions of 1776 and 1790. The Minutes of the Convention that formed the present Constitution of Pennsylvania, together with the Charter to William Penn, the Constitutions of 1776 and 1790, and a View of the Proceedings of the Convention of 1776, and the Council of Censors. Harrisburg, 1825.—*From Mr. John Vaughan.*

Enactments by the Rector and Visiters of the University of Virginia. Charlottesville, 1825.—*From Dr. Dunglison.*

Annales des Mines, ou Recueil de Mémoires sur l'Exploitation des Mines. Troisième série. Vol. XV. No. 2, for 1839. Paris, 1839.—*From the Council of Mines.*

The American Journal of the Medical Sciences. Edited by Isaac Hays, M. D. No. XLIX, for November, 1839. Philadelphia, 1839.—*From the Editor.*

The committee, consisting of Dr. Patterson, Mr. Justice, and Prof. A. D. Bache, on Mr. E. Otis Kendall's paper, read November 1, and entitled "On the longitude of several places in the United States, as deduced from the observations of the Solar Eclipse of September 18th, 1838. By E. Otis Kendall, Professor of Mathematics in the Central High School of Philadelphia," reported in favour of publication in the Society's

Transactions. The publication was ordered accordingly. The following abstract of the paper was contained in the report of the committee.

The paper contains the reductions of all the observations of the Annular Eclipse of the Sun, September 18th, 1838, yet reported to the Society: together with those of Mr. Hallowell at Alexandria, D.C.; of Messrs. Olmsted, Mason and Smith, at New Haven; and of Mr. J. Blickensderfer, jr. of Dover, Tuscarawas county, Ohio. The computations were made after Bessel's method.

The corrections of the elements in the Nautical Almanac as derived from eight equations of condition, from the durations of the ring, and twelve from that of the eclipse, were

$\epsilon = -\ 14.''782$ = correction of moon's place on true orbit.
$\zeta = -\ 7.''310$ = correction of do. on a secondary to do.
$\eta = -\ 3.''198$ = correction of sum of semi-diameters.
$\eta' = +\ 0.''515$ = correction of difference of do.

In which η and η' refer to Burckhardt's semidiameter of the moon and Bessel's semidiameter of the sun. The value of ϵ is obtained by assuming the longitude of the State House, Philadelphia, to be 5h 0m 39s, west of Greenwich. After applying these corrections of the elements, Mr. Kendall deduces the following longitudes of the places of observation.

The constant value of a was 2.2035 whence, $a\epsilon = -$ 32s. 571. The values in the last column are, calling d' the resulting longitude, not corrected for the errors of the tables.

$d = d' + a\epsilon + b\zeta + c\eta$ for beginning or end.
$d = d' + a\epsilon + b\zeta + c\eta'$ for the annular phase.

Place of Observation.	Mean Time of Observation.		b	c	Longitude + East — West from Greenwich.	
	h m s				h m s	
Western Reserve College, Hudson, Ohio,	B. 2 38 17.02		−0.355	+2.332	−5 25 40.70	
Dover, Tuscarawas County, Ohio,	B. 2 39 38.82		−0.372	+2.235	−5 25 52.71	
	F. R. 4 0 25.71		−0.848	+2.361		45.44
	R. R. 4 6 9.63		+0.302	−2.224		59.60
	E. 5 18 3.64		−0.151	−2.209		59.45
Alexandria, D. C.	B. 3 5 52.00		−0.298	+2.223	−5 8 24.44	
	F. R. 4 24 6.00		−0.093	+2.205		29.16
	R. R. 4 30 13.00		−0.345	−2.229		16.46
	E. 5 39 25.00		−0.131	−2.208		38.79
Washington Capitol,	B. 3 6 9.23		−0.294	+2.223	−5 8 3.25	
	F. R. 4 24 27.61		−0.014	+2.204		2.72
	R. R. 4 30 18.05		−0.405	−2.240		2.73
	E. 5 39 54.76		−0.134	−2.208		1.96
Haverford School, Pa.	B. 3 12 17.59		−0.231	+2.216	−5 1 12.03	
	F. R. 4 30 29.63		+1.412	+2.617		13.98
	R. R. 4 34 44.80		−1.961	−2.949		13.71
	E. 5 44 28.24		−0.165	−2.210		17.73
Philadelphia State House,	B. 3 13 10.06		−0.229	+2.215	−5 0 37.79	
	F. R. 4 31 18.76		+1.420	+2.621		38.72
	R. R. 4 35 31.35		−1.965	−2.952		40.16
	E. 5 45 15.46		−0.164	−2.210		39.32
Germantown, Pa.	B. 3 12 54.90		−0.228	+2.215	−5 0 40.99	
	F. R. 4 31 8.90		+1.501	+2.665		40.75
	R. R. 4 35 18.40		−2.070	−3.023		38.83
	E. 5 45 7.90		−0.166	−2.210		36.06
Burlington, N. J.	B. 3 14 23.70		−0.220	+2.214	−4 59 24.69	
	F. R. 4 32 32.60		+1.743	+2.810		28.99
	R. R. 4 36 19.60		−2.350	−3.222		29.55
	E. 5 46 8.50		−0.168	−2.210		30.35
Princeton, N. J.	B. 3 14 43.01		−0.167	+2.213	−4 58 43.69	
	F. R. 4 33 11.27		+2.245	+3.146		43.68
	E. 5 46 38.89		−0.174	−2.210		30.70
Weasel Mountain, N. J.	B. 3 15 56.98		−0.189	+2.211	−4 56 46.75	
	F. R. 4 35 57.09		+6 875	+7.220		48.26
	R. R. 4 35 58.09		−6.912	−7.255		49.10
	E. 5 47 13.10		−0.187	−2.213		51.34
Brooklyn, N. Y.	B. 3 17 18.80		−0.189	+2.211	−4 56 0.02	
	F. R. 4 36 47.30		+5.329	+5.766		0.80
	E. 5 48 23.63		−0.184	−2.211		2.31
New Haven,	B. 3 21 14.47		−0.155	+2.209	−4 51 47.65	
	E. 5 51 17.00		−0.199	−2.213		56.82
Southwick, Mass.	B. 3 20 19.00		−0.139	+2.208	−4 51 16 92	
	E. 5 50 27.00		−0.215	−2.214		20.16
Wesleyan University, Conn.	B. 3 22 0.81		−0.145	+2.208	−4 50 43.62	
	E. 5 52 1.46		−0.205	−2.213		41.73
Williamstown College, Mass.	B. 3 17 19.90		−0.132	+2.206	−4 52 26.93	
Dorchester Observatory,	B. 3 28 10.90		−0.099	+2.206	−4 44 22.76	

The Committee, consisting of Prof. A. D. Bache, Dr. Patterson, and Mr. Walker, on Prof. Loomis's paper, read October 18th, and entitled "Additional Observations of the Magnetic Dip in the United States, by Elias Loomis, Prof. of Mathematics and Natural Philosophy in Western Reserve College," reported in favour of publication in the Transactions of the Society. The publication was ordered accordingly. The following abstract was given in the report of the Committee.

The paper of Prof. Loomis contains the result of his observations of the magnetic dip at twenty-two places in the United States. The stations, with the latitude and longitude of each, the date of the observations for dip, and the determinations resulting from them, are as follows: 1. Hudson, Ohio, lat. 41° 15′ N., long. 5h. 21m. W., August 16th and 19th, 1839, A. M. Dip 72° 48′.4. Buffalo, New York, lat. 42° 53′ N., long. 5h. 16m. W., August 31st, A. M. Dip 74° 40′.8. Oswego, New York, lat. 43° 26′ N., long. 5h. 6m. W., September 1st, A. M. Dip 75° 11′.3. Syracuse, New York, lat. 43° N., long. 5h. 5m. W., September 2d, A. M. Dip 74° 50′.9. Utica, New York, lat. 43° 9′ N., long. 5h. 1m. W., September 3d, P. M. Dip 74° 57′.2. Schenectady, New York, lat. 42° 48′ N., long. 4h. 56m. W., September 4th, P. M. Dip 74° 36′.1. Albany, New York, lat. 42° 39′ N., long. 4h. 55m. W., September 4th, noon. Dip 74° 51′.3. West Point, New York, lat. 41° 25′ N., long. 4h. 56m. W., September 5th, P. M. Dip 73° 27′.4. New York City, lat. 40° 43′ N., long. 4h. 56m. W., September 9th, A. M. Dip 72° 52′.2. New Haven, Connecticut, lat. 41° 18′ N., long. 4h. 52m. W., September 11th, A. M. Dip 73° 26′.7. Hartford, Connecticut, lat. 41° 46′ N., long. 4h. 51m. W., September 13th, A. M. Dip 73° 58′.1. Springfield, Massachusetts, lat. 42° 6′ N., long. 8h. 50m. W., September 14th, A. M. Dip 74° 06′.9. Longmeadow, Massachusetts, lat. 42° 2′ N., long. 4h. 50m. W., September 14th, P. M., 74° 05′.3. Worcester, Massachusetts, lat. 42° 16′ N., long. 4h. 47m. W., September 16th, P. M. Dip 74° 20′ .6. Cambridge, Massachusetts, lat. 42° 22′ N., long. 4h. 44m. W., September 17th, P. M. Dip 74° 20′.1. Providence, Rhode Island, lat. 41° 50′ N., long. 4h. 46m. W., September 19th, P. M., 73° 59′.6. Princeton, New Jersey, lat. 40° 22′ N., long. 4h. 58m. W., September 21st, A. M. Dip 72° 47′.1. Philadelphia, Pennsylvania, lat. 39° 57′ N., long. 5h.

1m. W., September 23d, A. M. Dip 72° 7′.1. Baltimore, Maryland, lat. 39° 17′ N., long. 5h. 7m. W., September 25th, A. M. Dip 71° 50′.3. Washington City, lat. 38° 53′ N., long. 5h. 8m. W., September 25th, P. M. Dip 71° 21′.4. Pittsburgh, Pennsylvania, lat. 40° 32′ N., long. 5h. 20m. W., September 30th, A. M. Dip 72° 38′.9. Beaver, Pennsylvania, lat. 40° 44′ N., long. 5h. 22m. W., October 1st, A. M. Dip 72° 40′.3. Hudson, Ohio, lat. 41° 15′ N., long. 5h. 26m. W., October 7th, P. M. Dip (observations repeated) 72° 45′.9.

These observations were made with the instrument by Gambey, with which the results contained in Prof. Loomis's former paper were obtained. The series is the most extensive yet made in the United States, with which the Committee are acquainted.

The Committee, consisting of Dr. Hare, Dr. Bache, and Mr. Booth, on a paper entitled "On a new compound of deutochloride of platinum, nitric oxide, and hydrochloric acid; by Henry D. Rogers, Professor of Geology in the University of Pennsylvania, and Martin H. Boyè, Graduate of the University of Copenhagen," reported in favour of publication in the Transactions of the Society. The publication was ordered accordingly.

This substance is procured by dissolving platinum in an excess of nitromuriatic acid, and evaporating nearly to dryness; after which it is treated with aqua regia, freshly prepared, from concentrated hydrochloric and nitric acids. A little water is afterwards added, drop by drop, just sufficient to keep the chloride of platinum dissolved, when the compound will remain in the form of a gamboge yellow powder. It is then separated by decanting and filtering, and pressed between the folds of bibulous paper, and dried *in vacuo* over sulphuric acid.

The precipitate is a yellow, minutely crystalline powder, which absorbs water with great avidity. It may be preserved, without decomposition, in dry air, or *in vacuo*. It is decomposed by water, alcohol, &c., with extrication of nitric oxide, chloride of platinum remaining in solution. A concentrated solution of chloride of platinum has, however, no action on it. Heated in an atmosphere of hydrogen, it gives off a large amount of chloride of ammonium, leaving a residuum of metallic platinum.

Analysis.—The salt analysed, was prepared and kept in the man-

ner described. Heated to the temperature of 212° F., it does not part with any of its water of combination. For estimating the amount of platinum and chlorine, the salt was fused with carbonate of potassa, &c., and the platinum, thus obtained, weighed by itself, and the chlorine precipitated from the solution by nitrate of silver.

The quantity of nitric oxide was determined by introducing a portion of the salt into a graduated tube, inverted over mercury, and decomposing it by letting up the requisite proportion of water.

The mean of a series of experiments, varied in different ways, gave

Platinum,	-	41.26 per cent.
Chlorine,	-	43.89 "
Nitric oxide,		4.98 "

The above results correspond to five atoms of bichloride of platinum; five atoms of hydrochloric acid, and two atoms of nitric oxide. The water was calculated from the loss, in the analysis, to be equivalent to ten atoms.

Respecting the chemical nature of this compound, it may be regarded, either as a chloride of platinum, with a muriate of nitric oxide, represented by the following formula, $(Pt\ Cl^2)^5 + [(Cl\ H)^5 + (NO^2)^2] + 10$ Aq, or as a double chlorosalt, a chloroplatinate of nitrogen, with a chloroplatinate of hydrogen, represented by the formula, $[(Pt\ Cl^2)^2 + N\ Cl^2]^2 + (Pt\ Cl^2 + H\ Cl) + 14$ Aq.

Professor A. D. Bache made a verbal communication in which he compared the observations on the magnetic dip by Professor Loomis, contained in his paper ordered this evening for publication, with those given in a paper by Professor Courtenay and himself, read before the Society in 1834.

Professor Bache remarked, that as some of the stations of a series of observations for magnetic dip made by Professor Courtenay and himself, and published in the fifth volume of the Society's Transactions in 1835, were the same as those of the series of Professor Loomis, about to be published, it might be of interest to compare the results. The annexed table was given as containing the places, dates, and results of observations in the two series.

Place.	*Series by Professors Bache and Courtenay.*		*Series by Professor Loomis.*	
	Magnetic Dip.	Date.	Magnetic Dip.	Date.
		1834.		1839.
Baltimore,	70° 58'.6	July 19, P. M.	71° 50.3	Sept. 25, A. M.
Philadelphia,	72 00 .2	July 25, August 4, P. M.	72 07.1	Sept. 23, A. M.
New York,	72 51 .7	August 7, A. M.	72 52.2	Sept. 9, A. M.
West Point,	73 37 .2	April, May, June, July.	73 27.4	Sept. 5, P. M.
Providence,	74 02 .8	August 8, P. M.	73 59.6	Sept. 19, P. M.
Springfield, Mass.	74 10 .7	August 10, A. M.	74 06.9	Sept. 14, A. M.
Albany,	74 40 .1	August 11, P. M.	74 51.3	Sept. 4, noon.

Professor Bache further remarked, that in regard to the results for Baltimore, he had at first supposed that an error of a degree had occurred in recording or transcribing the observations of one or other series. The difference of dip between New York and Philadelphia was nearly fifty minutes; and it was, therefore, not probable that that between Philadelphia and Baltimore should be only seventeen minutes, according to the numbers of Professor Loomis as they now stand.

On the other hand, the dip reported by Professor Loomis agrees better with the determination of Professor Patterson at Charlottesville, and of Lieutenant Wilkes at Washington. The discrepancy thus not being easily reconciled, it is much to be desired that other observations should be made at Baltimore.

The agreement of the results for New York, Providence and Springfield, is reasonably close; though, if the diminution of dip in the interval of the two series be considered, the agreement at New York will not be so close. At Philadelphia, Professor Bache has ascertained by recent experiments made for the purpose, that the difference between Professor Loomis and himself might be explained by the difference in the stations used; there being considerable local attraction at one or the other, though he had not yet ascertained which represented most properly the dip due to the position of Philadelphia. The difference at West Point certainly, and that at Albany probably, resulted from using different stations for observation. Professor Courtenay had found the magnetic dip at the middle of the plain at West Point, to differ several minutes from that at his house to the west of the plain. Professor Loomis had used a station near the steamboat landing. At Albany, he had observed near the station formerly used by Professor Henry in the Academy Park; and as the dip found by him in 1839, was nearly the same as that found by Professor Henry in 1834, the discrepancy between them might be considered as amounting

to the diminution of dip in the interval. Professor Bache stated that it was so desirable that each succeeding observer in a given place should, when a well selected site had been employed for observations, use the same, that he had only left the position used by Professor Henry on account of changes which had been made by putting up an iron railing about the Park. In the case of the two series by Professor Loomis, and by Professor Courtenay and himself, the stations did not appear to have been generally in common.

Professor Bache further observed that the diminution of dip at New York, according to his observations, compared with those of Major Sabine, had been at the rate of nine minutes in twelve years, between 1822 and 1835; while those of Professor Loomis would give but eight minutes in seventeen years. Both results are probably too small.

Professor Bache concluded by stating, that the general tenor of the comparison between these two series of observations, indicates that the relative correction for the two pairs of needles was subtractive for those of Professor Loomis, and additive for those which he had used; but that as they had been furnished by the same maker, and were of similar dimensions, there was, until they had been compared with other needles, no just ground of preference for either.

The following resolutions in relation to combined magnetic observations were adopted:

Resolved, That in the opinion of the American Philosophical Society, it is highly desirable that the combined series of magnetic observations now in progress under the direction of the British government, should be extended to the United States, by the establishment of Magnetic Observatories at suitable places.

Resolved, That a Committee be appointed, with authority, on behalf of the Society, to invite the attention of one of the departments of the Government of the United States to the plan for combined magnetic observations, a sketch of which was presented in the documents from a Committee of the Royal Society of London, and to urge co-operation in the plan as a national undertaking, in every way worthy of the United States.

The Committee under the above resolution, consists of Professor Bache, Doctor Patterson, Professor Henry, Mr. Kane, and Colonel Totten.

Professor Bache, reporter, stated that No. 8 of the Proceed-

ings of the Society was in the hands of the Librarian for distribution.

Mr. Fisher reported the decease of Mr. Levett Harris, a member of this Society.

Stated Meeting, December 6.

Present, thirty-two members.

Dr. PATTERSON, Vice-President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

The Transactions of the Royal Irish Academy. Vol. XVIII. Part Second. Dublin, 1839.—*From the Royal Irish Academy.*

Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. Aus dem Jahre, 1837. Berlin, 1838.—*From the Royal Academy of Sciences of Berlin.*

Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin, im Monat Juli, 1838. Berlin, 1838.—*From the same.*

Roteiro Geral dos Mares, Costas, Ilhas, e Baixos reconhecidos no Globo. Extractado per Ordem da Academia Real das Sciencias, por Antonio Lopes da Costa Almeida. Vol. II. Part Third. Lisbon, 1838.—*From the Royal Academy of Lisbon.*

Compendio de Botanica do Doutor Felix de Avellar Brotero. Apresentado á Academia Real das Sciencias. Vol. II. Lisbon, 1839.—*From the same.*

Astronomia Spherica e Nautica, por Mattheus Valente do Couto. Lisbon, 1839.—*From the same.*

Memoria sobre os Pesos e Medidas de Portugal, Espanha, Inglaterra, e França. Por Fortunato Jose Barreiros. Lisbon, 1838.—*From the same.*

Annaes da Marinha Portugueza. Por Ignacio da Costa Quintella. Vol. I. Lisbon, 1839.—*From the same.*

Reports on the Fishes, Reptiles, and Birds of Massachusetts. Boston, 1839.—*From Mr. G. B. Emerson.*

Histoire Militaire du Piémont par le Comte Alexandre de Saluces. Five volumes. Turin, 1818.—*From the Author.*

Tableau Statistique et Politique des Deux Canadas. Par M. Isidore Lebrun. Paris, 1833.—*From Mr. Du Ponceau.*

Memoirs of the Hon. Thomas Jefferson. Two volumes. New York, 1809.—*From the same.*

La Revue Américaine. Vols. I. II. & III. Paris, 1826 and 1827.—*From the same.*

Archives of Useful Knowledge. By James Mease, M. D. Philadelphia, 1813.—*From the Editor.*

Annals of Tryon County, or the Border Warfare of New York, during the Revolution. By William W. Campbell. New York, 1831.—*From the same.*

Memoir of Nathaniel Bowditch. By Nathaniel Ingersoll Bowditch. Boston, 1839.—*From the Author.*

A Descriptive Catalogue of the Chinese Collection in Philadelphia. Philadelphia, 1839.—*From Mr. Dunn.*

Discourse on the Integrity of the Legal Character. By Job R. Tyson, Esq. Philadelphia, 1839.—*From the Author.*

General Karte der sichtbaren Seite der Mondoberfläche. Von W. Beer und J. H. Mädler. Berlin, 1837.—*From Professor A. D. Bache.*

Sopra una Meteora luminosa osservata in Filadelfia dal Regio Console delle Due Sicilie negli Stati Uniti di America. Naples, 1839.—*From the Chev. Morelli.*

Magazine of Natural History. Edited by Edward Charlesworth. Vol. II. New Series. Nos. 31, 32, 33, 34 and 35. London, 1839.—*From the Editor.*

FOR THE CABINET.

A Bust of Simeon De Witt, late Surveyor General of the State of New York.—*From Mr. Richard V. De Witt.*

The Librarian presented to the Society, in the name of the Rev. James P. Engles, a manuscript Treatise on the Means of extending the Learning and Civilization of Europe to the English Empire in India. By C. E. Trevelyan, at Kotah, which was ordered to be deposited in the Archives of the Society.

The Committee of Publication reported, that the sixth volume of the Transactions of the Society was completed.

Professor A. D. Bache made a verbal communication, accompanied by a chart, showing the changes of magnetic variation on the last two terms of the German Magnetic Association; namely, the 30th of August and 30th of November, of the present year.

Professor Bache also presented, on behalf of the Committee on Magnetic Observations, appointed at the last meeting of the Society, a Memorial, addressed to the Secretary of War of the United States, inviting the establishment of Magnetic Observatories, and co-operation in the system of magnetic and meteorological observations now in progress under the direction of the British Government.

Hall of the American Philosophical Society,

PHILADELPHIA, *December*, 1839.

To the Hon. JOEL R. POINSETT, *Secretary of War, &c. &c.*

Sir:—The undersigned have been appointed a Committee of the American Philosophical Society, to call your attention to, and to invite, through the medium of your department, co-operation in, the extensive system of magnetic and meteorological observations about to be made under the direction of the British Government, and in connexion with their Antarctic expedition, particularly directed towards magnetic investigations.

The science of terrestrial magnetism has of late years made great advances, through the instrumentality of Humboldt, Hansteen, Gauss and others, and has now reached that point where a system of combined observations at widely distant points over the surface of the globe, appears to be necessary to its further progress: desultory effort has already done all that it is competent to effect. Such a series of systematic observations has now been set on foot by the British Government, directed to a better determination of the magnetic lines, for the use of navigators, and to the accurate investigation of the magnetic elements for theoretical purposes. The objects embraced are the measurement of the magnetic intensity, dip, and variation, at different stations, by a nautical expedition, and at fixed observatories, and especially the investigation of the variations of these elements at the latter points. As subsidiary to these objects, combined meteorolo-

gical observations are to be made, which cannot fail to elucidate some of the most important questions in this useful science.

The magnetic changes to be investigated are of three kinds: first, those which, depending upon a cause not yet satisfactorily explained, take place slowly but regularly, causing a general displacement of the lines of equal variation and dip; secondly, those which, depending upon the position of the sun, run through their period of change in a year or day, producing different values in the magnetic elements, according to the season or to the hour of the day; and thirdly, the small disturbances which appear to be constantly taking place, and which require for their measurement continued observation with the most accurate instruments.

The striking fact was proved in 1818, by the observations of Arago at Paris, and of M. Kupffer at Kasan, that the large changes which take place in the position of the horizontal needle during the day, are simultaneous at these places, so distant from each other; and a confirmation of the fact as applying to even more distant stations, resulted from the system of observations established by Humboldt and others in 1830, and extended, through the influence of the Imperial Academy of Sciences of St. Petersburg, to the most remote parts of the Russian empire, and even to Pekin. In 1834, the celebrated German philosopher Gauss, invented an instrument for measuring the variation of the needle and its changes, which introduced into these determinations an accuracy similar to that attainable in astronomical measurements. This instrument was soon furnished to different observatories, and a concerted system of observations of the minute changes of variation was introduced, which is now going on at no less than twenty-three places in Europe, the smaller and larger states having vied with each other in providing the means of executing them. The stations include Altona, Augsburg, Berlin, Bonn, Brunswick, Breda, Breslau, Cassel, Copenhagen, Cracow, Dublin, Freyberg, Göttingen, Greenwich, Halle, Kasan, Leipsic, Marburg, Milan, Munich, Naples, St. Petersburg, and Upsala.

The results already obtained and published by the German Magnetic Association, have proved satisfactorily that the minute changes in the direction of the needle, as well as the larger ones, are simultaneous at the different stations, varying however in amount, and the variation appearing to decrease in passing southward; but the influence of the position of the place, whether depending upon geographical or magnetic position, not having yet been fully determined, and being

probably determinable only by observations at places even more distant from each other than those now embraced in the German series.

The invention of an instrument by Gauss, for determining the changes in horizontal magnetic intensity with the same accuracy as those of the direction of the needle, will give rise to interesting developments in regard to them; and the changes of the three elements of horizontal direction, and horizontal and vertical intensity are all included by the two instruments before referred to, and a third invented by Professor Lloyd, of Dublin. It is the object of the series now projected, to embrace these three elements; to extend the number of stations with special reference to their distribution at points of the earth interesting in their magnetic relations; to keep up a constant series of simultaneous observations for three years; and thus to effect, on an extended scale, what the German Magnetic Association has so well begun. The execution of this plan, with observations of an appropriate kind, directed also to magnetic research, by a naval expedition, was recommended to the British Government by the members of the British Association, including men of science from different countries, in 1838. It subsequently received the sanction of the Royal Society of London, was adopted by the Government, and is now in course of execution. It may be considered, therefore, to have been approved by the highest scientific authorities. In pursuance of this plan, stationary observatories are to be established, and regular observations made, for the next three years, at Toronto in Upper Canada, at St. Helena, at the Cape of Good Hope, and at a station in Van Dieman's Land. The East India Company have also undertaken to furnish the means of observation at nine points in their dominions. European Governments, who have not hitherto joined in the German system, with which this will be in connexion, have also promised similar aid. It is this extended scheme, to which our attention has been specially invited by a circular from the Royal Society of London, and in which the American Philosophical Society desires that our country should co-operate. It is on a broad scale, worthy of all encouragement, and the magnitude of the scheme, the objects for which it is undertaken, and the possibility of its execution, all mark the character of the period in which we live.

The Society would propose, in furtherance of this plan, that five magnetic observatories should be established in the N. E., N. W., S. E., S. W., and at some central point of the United States, furnished with the instruments and observers necessary, fully to carry out the

proper plan of combined magnetic and meteorological observations. Should the proposition to make this co-operation truly national, be acceded to, the details in relation to it can easily be arranged, and the Society will, the undersigned confidently believe, feel proud to lend any aid in their power, in planning or executing them. It may perhaps be more satisfactory however, to state briefly, beforehand, the nature of the observations to be made, and the means required for their execution.

The magnetic observations to be undertaken at the fixed observatories are, first, of the variation (declination), absolute horizontal intensity and dip; second, of the changes of the variation of the horizontal intensity, and of the vertical intensity. The regular observations for changes in these elements, are to be made every two hours every day, (with the exception of Sundays,) for the next three years, beginning as soon as the several observatories can be arranged. To these are to be added more frequent observations on one day of each month, including the four terms during the year, fixed by the German Magnetic Association. At each station, a building of stone or wood will be required, in the construction of which no iron must be employed. The instruments adopted by the British observers are the following: A magnetometer for the declination, one for the horizontal force, one for the vertical force, a dipping needle, azimuthal transit, two reading telescopes, and two chronometers. The estimated cost of each set of these, is about fourteen hundred dollars. The cost of the observatory must vary with the place at which it is erected, and the material chosen for it, but may be estimated at from one thousand to fifteen hundred dollars. One principal and three assistants will suffice for making and reducing the observations at each station, and for carrying on a supplementary series of meteorological observations. The meteorological observations proposed, are on the pressure, temperature, and moisture of the air; on the direction and force of the wind; on the quantity of rain; on the temperature of the ground at different depths; on solar and terrestrial radiation; besides a few miscellaneous and occasional observations, not necessary to be here stated. Regular observations are to be made on these points, four times every day, and every hour on one day in each month. The instruments required at each station, are a barometer, a standard thermometer, a maximum and minimum thermometer, a hygrometer, an anemometer, several extra thermometers, an actinometer, and an apparatus for atmospheric electricity. The probable cost of each set of these would

not exceed two hundred and fifty dollars. The value of the results would be much increased, by providing a self-registering anemometer and rain-gauge, instead of the common ones, which would increase the cost of each set of instruments to five hundred and seventy dollars. The whole cost of erecting the five observatories, and providing them with excellent instruments, will probably not exceed sixteen thousand dollars; and if the observatory already existing at Philadelphia, and provided with the necessary instruments, should be adopted as one of the five, and four others be erected and furnished, the expense to the United States would not exceed twelve thousand dollars.

No estimate is made of the cost of the principal and assistants for the proposed observatories. In the organization of the new British stationary observatories, these persons are taken, in part, if not altogether, from the officers, non-commissioned officers, and privates of the artillery. The acquirements of the graduates of our Military Academy, admirably fit them for directing the observatories, which might be appropriately placed at military posts; so as to provide the officers and men necessary for making the observations, without additional expense. The direction thus given to the views of the Committee; the fact that you have long been enrolled as a member of the American Philosophical Society; and the interest which you have always manifested, both as an individual and in a public capacity, in all enterprises calculated to shed a lustre upon your country, have induced the Society to direct us to address ourselves particularly to you on this subject.

With the hope that your views may coincide with those of the Society, in regard to the plan now presented for your consideration, we are,

Very respectfully, yours,

A. D. Bache,
R. M. Patterson,
Joseph Henry,
J. K. Kane,
Jos. G. Totten,
Committee.

Dr. Patterson laid before the Society a specimen of the Daguerreotype, by Mr. Robert Cornelius, of Philadelphia.

Dr. Hays communicated a case of perverted vision, in which all perpendicular lines appeared double, while horizontal ones

were seen accurately. This occurred in a gentleman who was labouring under catarrhal inflammation of the conjunctiva, and ceased with the removal of the disease.

Dr. Hare made the following verbal communications.

For effecting the congelation of water by the evaporation of ether, it had been usual to expose a bulb, containing water and moistened by the ether, to a current of air. Recently Dr. Hare had succeeded far more satisfactorily by exposing a quantity of water, twenty times as large as that usually employed, covered by ether in a capsule to a blast of air, proceeding from a vessel in which it had been condensed by a pressure equal to one or two atmospheres. By these means, the freezing of the water might be seen by five hundred spectators.

Having mentioned that the pure hyponitrous ether recently obtained, caused a cold of 15° by its evaporation, it would of course be inferred, as he had found to be the fact, that this last mentioned ether might be advantageously employed.

When hydric ether is employed, it should not exceed 730 in specific gravity.

Dr. Hare further said, that it would probably be remembered, that about two years since, he had published an account of a new process for freezing water by the evaporation of ether, caused by a diminution of atmospheric pressure. In the process then described, concentrated sulphuric acid was interposed between the retort holding the water and ether, and the air pump. Since that time he had rendered the process more rapid and interesting by interposing an iron mercury bottle, with two cocks between the receiver holding the acid and the pump. The ether and water were introduced into the retort. The beak of the retort, properly bent, entered the receiver, through the tubulure to which it was luted. The beak was of such a length and curvature, as to cause its orifice to be below the surface of the acid. The neck of the receiver communicated with the cavity of the bottle, that of the bottle with the pump. The apparatus being thus arranged, the bottle was exhausted, and the cock, communicating with the pump, closed. Under these circumstances, on opening a communication between the bottle and receiver, the pressure in that vessel and in the retort was so much reduced as to cause the instantaneous ebullition of the ether, so that little, if any subsequent aid, was required from the pump. But the

result which gave increased interest to the process, was the inconceivable rapidity with which the acid, under these circumstances, absorbed the ethereal vapour, which it appeared to do with greater avidity as the process advanced.

In fact, the water, in the act of congealing, flew all over the inner surface of the retort, in consequence of an explosive evolution of ethereal vapour, generated amid the aqueous particles. The congelation of the water was rendered evident to the ears as well to the eyes of his class of more than three hundred students.

Doctor Bache communicated the decease of the Hon. Jonathan Sewell, of Quebec, a member of the Society.

Stated Meeting, December 20.

Present, forty members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Appendix to Part V. of the Greenwich Observations, for the year 1834. (A missing number.) London, 1834.—*From the Royal Society of London.*

The Statutes at Large, of South Carolina. Edited under the authority of the Legislature. By Thomas Cooper, M. D., LL.D. Vol. V. Columbia, 1839.—*From Dr. Tidyman.*

A Map of the Extremity of Cape Cod. Executed under the direction of Major J. D. Graham, U. S. Top. Engrs.—*From the Author.*

Crania Americana; or a Comparative View of the Skulls of various Aboriginal Nations of North and South America. By Samuel George Morton, M. D. Philadelphia, 1839.—*From the Author.*

Medical and Topographical Observations upon the Mediterranean; and upon Portugal, Spain, and other Countries. By G. B. R. Horner, M. D., U. S. N. Philadelphia, 1839.—*From the Author.*

The State of the Prisons in England and Wales. By John Howard, F. R. S. Warrington, 1784.—*From Mr. John Vaughan.*

State of the Prisons in England, Scotland, and Wales. By James Neild, Esq. London, 1812.—*From the same.*

The Natural History of British Insects. By E. Donovan, F.L.S. Ten Volumes. London, 1793 to 1802.—*From the same.*

The Natural History of British Birds. By E. Donovan, F.L.S. London, 1794 to 1798. Five Volumes.—*From the same.*

The Natural History of British Fishes. By E. Donovan, F.L.S. Vol. I. London, 1802.—*From the same.*

Biographical Sketches of distinguished American Naval Heroes in the War of the Revolution. By S. Putnam Waldo, Esq. Hartford, 1823.—*From the same.*

An Account, Historical, Political, and Statistical, of the United Provinces of Rio de la Plata. Translated from the Spanish of Ignacio Nunes. London, 1825.—*From the same.*

Flora Caroliniensis, or an Historical, Medical, and Economical Display of the Vegetable Kingdom. By John L. E. W. Shecut. Vol. I. Charleston, 1806.—*From the same.*

Travels in Brazil, in the Years from 1809 to 1815. By Henry Koster. Two Vols. Philadelphia, 1817.—*From the same.*

History of Spain, from the establishment of the Colony of Gades, by the Phœnicians, to the death of Ferdinand, surnamed the Sage. Two Volumes. Dublin, 1793.—*From the same.*

History of the County of Worcester, in the Commonwealth of Massachusetts. By Peter Whitney, A. M. Worcester, 1793.—*From the same.*

The First Settlers of Virginia. New York, 1806.—*From the same.*

An Introduction to the Knowledge of Rare and Valuable Editions of the Greek and Latin Classics. By the Rev. Thomas Frognall Dibdin, F.S.A. Two Volumes. London, 1808.—*From the same.*

Repertorium Commentationum a Societatibus Litterariis Editarum. Secundum Disciplinarum Ordinem Digessit, J. D. Reuss. Historia, etc. Gottingen, 1810.—*From Mr. P. S. Du Ponceau.*

Historisch Statistische Darstellung des Nördlichen Englands. Von E. F. Rivinus. Leipsic, 1824.—*From the same.*

The Ruins of Pæstum and other Compositions, in verse. Salem, 1822.—*From the same.*

Athens, and other Poems. Salem, 1824.—*From the same.*

Academical Catalogues.—*From the same.*

The American Medical Library and Intelligencer. By Robley Dunglison, M. D. Nos. 15, 16, 17 and 18.—*From the Editor.*

The Committees of Finance and Publication, respectively made their Annual Reports, which were, on motion, accepted.

Doctor Hare made the following verbal communication relative to the application of radiant heat to glass.

Dr. Hare said, it did not appear to him that sufficient attention had been paid by artists or men of science, to the great difference which existed between the effect upon glass of heating it by radiation and by conduction. When exposed to radiant heat alone, unaccompanied by flame, or a current of hot air, glass is readily penetrated by it, and is heated, within and without, with commensurate rapidity; but, in the case of its exposure to an incandescent vapour or gas, the caloric could only penetrate by the process of conduction; and, consequently, from the inferior conducting power of glass, the temperature of the outer and inner portions of the mass would be so different, as by the consequent inequality of expansion to cause the fracture, which was well known, under such circumstances, to ensue.

The combustion of anthracite coal, in an open grate, in his laboratory, having four flues of about 4.12 by 2.12 inches each, in area, just above the level of the grate, (the upper stratum of the fire, having nothing between it and the ceiling,) had allowed him to perform some operations with success, which formerly he would have considered impracticable. The fire having attained to that state of incandescence to which it easily arrives when well managed, he had, on opening a hole by means of an iron rod, so as to have a perpendicular perforation extending to the bottom of the fire, repeatedly fused the beaks of retorts of any capacity, not being more than three gallons, causing them to draw out, by the force of gravity, into a tapering tube; so that, on lifting the beak from the fire, and holding the body of the retort upright, the fused portion would hang down so as to form an angle with the rest of the beak, or to have any desired obliquity. By these means, in a series of retorts, the beak of the first might be made to descend through the tubulure of a second; the beak of the second through that of a third, and so on; the beak of the last retort in the row being made, when requisite, to enter a tube passing through ice and water in an inverted bell-glass.

By means of the anthracite fire, as above described, thick rods, as

well as stout tubes, might, as he had found, be softened and extended, or bent into suitable forms.

The lower end of a green glass phial, such as is used usually for Cologne water, might be made to draw out into a trumpet-shaped extremity. A Florence flask might be heated, and made flat, so as to answer better for some purposes. The drawing out of tubes into a tapering form, suitable for introducing liquids through retort tubulures, was thus easily effected; and in all cases the sealing of large tubes was better commenced in this way, although the blowpipe might be necessary to close a capillary opening which could not be closed by the fire.

Dr. Hare further communicated a method of preparing pure chlorohydric acid, from the impure muriatic acid of commerce, by the action of sulphuric acid.

It is known, said Dr. Hare, that concentrated sulphuric acid, when added to liquid chlorohydric acid, expels more or less of it as a gas, in consequence of its superior affinity for water. At the present low price of the ordinary acid of commerce, Dr. Hare had found it advantageous to procure the latter in purity, by subjecting it to the former.

A tubulated glass retort, having been half-filled with chlorohydric acid, sulphuric acid was allowed to drop from a glass funnel, with a cock, into a tube descending into the acid in the retort through the tubulure, to which it was luted by strips of gum-elastic. The tube terminated in a very small bore. The beak of the retort, bent in the fire, as he had just described, descended through the tubulure into the body of a small retort containing water not refrigerated. The beak of the latter descended into a larger one, half full of water, to which ice was applied. Of course the beak of the third might, in like manner, enter the body of a fourth. After an equivalent weight of sulphuric acid had been introduced, and the evolution of gas was no longer sufficiently active, heat might be applied until nearly all the chlorohydric acid should come over.

The residual diluted sulphuric acid was, with the addition of nitrate of soda or potassa, or nitric acid, as serviceable for galvanic purposes, as if it had not been thus used.

Dr. Hare further communicated a method of preparing hydrochloric acid and chlorine in the self-regulating reservoir

invented by him, and spoke of some of the applications of the gases thus prepared.

Dr. Hare was under the impression that few chemists were aware of the great advantage of the self-regulating reservoirs of gas, to which he had resorted. He was enabled, by means of them, to keep hydrogen, carbonic acid, nitric oxide, chlorine, chlorohydric acid, sulphydric acid, and arseniuretted hydrogen, so as to use any of these gases at pleasure. He had kept these reservoirs in operation for months, without taking the constituent vessels apart.

By means of the reservoir of chlorohydric acid he had been encouraged to make an effort which proved successful; to form artificial camphor by the impregnation of oil of turpentine with that gas.

Subjecting an ingot of tin to a current from his reservoir of chlorine, it was rapidly converted into the bichloride, or fuming liquor of Libavius. To his surprise the ingot was fused by the heat generated. In the last mentioned reservoir the materials were manganese, in lumps, and concentrated chlorohydric acid, diluted sulphuric acid being also introduced; as the reaction of this last mentioned acid with the manganese was more active than that of the chlorohydric acid. In fact, sulphuric acid, diluted with its weight of water and common salt, might be used without chlorohydric acid. In the reservoir for chlorohydric acid, the materials were sal ammoniac and sulphuric acid, to which some water was added, but not so much as to prevent the chlorohydric acid from assuming the gaseous state.

He had found it preferable to keep the sulphydric acid reservoir in a flue, the gas being drawn, when wanted, through a globe of water, by means of a leaden tube, at a convenient place. It would be desirable that the reservoirs of chlorine and chlorohydric acid should be similarly situated.

Mr. Sears C. Walker made an oral communication on the subject of determining longitudes from corresponding observations of meteors.

It had been recently remarked by Prof. Schumacher, Astr. Nachr. No. 283, that, so far as his information extended, no trial had been made of the observation of meteors for determining longitude; though the subject had been proposed long since by Prof. Benzenberg. Accordingly, on the 11th of August, 1839, observations, chiefly of the instant of vanishing of meteors were made at the observatories of Altona, Bremen, Konigsberg, Breslaw, &c. with such success as to

lead Dr. Olbers to the conclusion announced in a succeeding No. (284) that observations of this kind are adequate for the complete determination of longitudes of places. By means of twelve coincidences on the same night, Prof. Boguslawski found the Breslaw Observatory to be 28m 22s.07 east of Altona, differing less than a second from that which had been previously adopted.

As the subject of priority in this inquiry might be considered important, Mr. Walker deemed it his duty to communicate the substance of a letter from Prof. Alexander, of Princeton College, New Jersey, dated January 14th 1839, in which is contained the result of seven coincidences of observations of meteors, made 25th Nov. 1835, by Messrs. A. D. Bache and J. P. Espy, at the house of Prof. Bache, in Philadelphia, and by Professors Henry and Alexander, at the Philosophical Hall, 0.1*s*. east of Nassau Hall, College of New Jersey, at Princeton. As the time referred to by the Philadelphia observers is that of the University of Pennsylvania, which is about 0.7*s*, west of the State House, Philadelphia, the differences of longitude, given by Prof. Alexander, have been diminished by 0.6*s*. to reduce them to the State House, Philadelphia, and Nassau Hall, Princeton. The results are contained in the table. The time of the disappearance of the meteors was noted.

Meteor.	N. Hall, East of State House.	Comparative Weight.	Observers.
a	+2m. 0.45sec.	1	Espy and Alexander.
b	+2 „ 0.30 „	1	" and " and Henry,
c	+1 „ 59.20 „	0.5	" and Henry,
d	+2 „ 0.20 „	1	" and "
e	+2 „ 1.00 „	1	Bache and "
f	+2 „ 0.80 „	1	" and Alexander,
g	+2 „ 2.60 „	0.5	Espy and Henry.
	Mean according to weights + 2 *m* 0.61 *sec.*		
	S. House, W. of Greenwich — 5*h*. 0 „ 39.12 „		
	N. Hall, W. of Greenwich — 4„ 58 „ 38.51 „		No. 1.

In order to judge of the degree of precision of this result, an extract of a letter from Robert Treat Paine, Esq. dated June 10th, 1839, was read, giving his determination of the same by transportation of three chronometers in May last, from Princeton to Castle Garden, New York, and thence to Boston, as follows:

State House, Boston —	4h.	44m.	16.60sec.	
Castle Garden, West —		11 „	46.33 „	
Nassau Hall, W. of C. Garden —		2 „	35.14 „	
Nassau Hall, W. of Greenwich —	4 „	58 „	38.07 „	No. 2.

A further comparison was furnished from the observations of the solar eclipse of Sept. 18th, 1838, as reduced by Prof. Kendall, and from those of several occultations reduced by Mr. Walker.

Comparisons with the High School Observatory. Assumed longitude—5h. 0m. 42s. Resulting longitude of Nassau Hall,

		h.	m.	s.		
1838, Sept. 18th.	Solar Eclipse four phases,	— 4	58	37.64	weight	2.0
Nov. 21,	Im. ω Sagittarii,			34.62		1.0
Dec. 27,	Im. η Pleiadum,	— 4	58	39.42		
"	" f "			36.35	36.80	1.7
"	" h "			34.62		
1839, April 19,	" c Geminorum,			39.84		1.0
No. 3,	Mean according to weights,	— 4	58	37.25		5.7

Comparisons with the State House, Boston. Assumed longitude — 4h. 44m. 16.6s.

		h.	m.	s.		
1838, Dec. 24,	Im. ε Piscium,	— 4	58	39.56	weight	1.0
27,	Im. f Pleiadum,			36.35		1.0
1839, April 19,	Im. c Geminorum,	— 4	58	39.31	39.27	1.4
	Do. at Dorchester Obs'y.			39.22		
No. 4.	Mean according to weights	— 4	58	38.49		3.4

The Immersion of f Pleiadum was also observed by Prof. Boguslawski at the Breslaw Observatory, longitude + 1h. 8m. 10.4s., whence Nassau Hall — 4h. 58m. 41.15s. No. 5, weight 1. This result is somewhat uncertain, from the variation of the co-efficient of the unknown error ζ of the moon's tabular place on a secondary to its orbit; since we have for the longitude, d = — 4h. 58m. 41.15s. — 2.353 $\times \zeta$ — 0.406 $\times \eta$, according to Bessel's Notation.

The mean results taken with their weights gave,

	h.	m.	s.		
No. 1	— 4	58	38.51	weight	6.0
2			38.07		3.0
3			37.25		5.7
4			38.49		3.4
5			41.15		1.0
Mean according to weights	— 4	58	38.20		19.1

Thus it appears that the observations of the 25th November, 1835, lead to the same conclusion as that which was subsequently in 1839, obtained by the European astronomers.